

Human-Centered Exploration of Organizational Readiness for AI Adoption Before Deployment

Experiential Industry-Academia Study across Croatian SMEs

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Motivation & Research Question

The AI Adoption Paradox

- ▶ Rapid LLM/GenAI technical advances vs. organizational adoption uncertainty.
- ▶ Existing literature mostly focuses on **post-deployment** evaluation.
- ▶ Critical gap: Empirical evidence on **pre-adoption** readiness.

Human-Centered AI Lens

- ▶ Priority on human oversight, trust, explainability & governance.
- ▶ Cognitive augmentation vs. human replacement.

Core Research Question (RQ)

"How do organizations perceive opportunities and challenges associated with AI adoption before deployment?"

Industry-Academia Collaborative Framework

- ▶ **Graduate Educational Context:** Situated within the *Engineering Complex Systems* course at Juraj Dobrila University of Pula.
- ▶ **Experiential Learning Model:** Connects systems engineering theories with real-world industry observations.
- ▶ **Interdisciplinary Student Teams:**
 - ▶ **Computer Science Students:** Technical feasibility, LLM capabilities, system architecture.
 - ▶ **Economics Students:** Business processes, organizational readiness, cost-benefit analysis.
- ▶ **Two Partner SMEs in Istria, Croatia:**
 1. **GASTRO-TIM d.o.o.:** Hospitality equipment engineering & manufacturing.
 2. **HISTRIS d.o.o.:** Food processing & meat production industry.

Case Context: GASTRO-TIM vs. HISTRIS

Characteristic	GASTRO-TIM	HISTRIS
Industry Sector	Hospitality equipment engineering	Food production & processing
Business Model	Customized project delivery (ETO)	Standardized product manufacturing
Primary Activities	Design, consulting, installation	Production, quality control, packaging
Knowledge Intensity	High (tacit engineering expertise)	Moderate to high (recipes, compliance)
Regulatory Burden	Moderate (ISO, project specs)	High (HACCP, food safety laws)
Customer Interaction	Highly customized projects	Product-oriented retail/distribution
AI Status	Pre-adoption (Not yet adopted)	Pre-adoption (Not yet adopted)

Research Design & 9D Analytical Framework

6-Phase Procedure

1. Framework Introduction
2. Company Visits & Field Tours (6h)
3. Student Reflective Reports (12)
4. Cross-Case Analysis & Prototypes (12)
5. Prototype Presentations (2h)
6. Stakeholder Validation (30m)

9 Analytical Dimensions (Galinac Grbac & Huljenić, 2026)

- ▶ Problem & Solution
- ▶ Human Interaction & Context
- ▶ Evaluation & Challenges
- ▶ Benefits & Transferability
- ▶ Process Optimization

Triangulation

Combined tours, 12 reports, transcripts, 12 prototype designs & C-level feedback.

Perceived AI Opportunities: Cognitive Augmentation

Core Finding: AI as Cognitive Support, NOT Human Replacement

Both SMEs view AI as an augmentation tool to enhance decision-making and knowledge availability.

Knowledge Management

- ▶ Capturing tacit employee expertise.
- ▶ Accelerating new employee onboarding.
- ▶ Reducing dependence on key individuals.

Communication & Training

- ▶ Interactive worker guidance on shop floors.
- ▶ Supplier & customer inquiry assistance.

Documentation Support

- ▶ GASTRO-TIM: Project reports & specs.
- ▶ HISTRIS: HACCP & compliance records.

Decision Support

- ▶ Rapid search in unstructured repositories.
- ▶ Predictive support for planning.

Recurring Organizational Barriers & Readiness Factors

Top 5 Socio-Technical Barriers to Adoption

1. **Trust & Hallucination Risk (Highest Barrier):** High uncertainty regarding LLM reliability in critical engineering or compliance decisions.
2. **Workflow Compatibility:** Fear of operational friction if AI does not seamlessly integrate with existing ERP/CRM systems.
3. **Governance & Accountability:** Unclear responsibility for AI recommendations, IP protection, and data privacy.
4. **Digital Maturity:** Lack of structured internal digital repositories required for LLM context/RAG.
5. **Workforce Skills & AI Literacy:** Need for employee training on prompt engineering and critical evaluation.

Cross-Case Synthesis & Sectoral Comparison

GASTRO-TIM (Engineering / ETO)

- ▶ **Focus:** Project coordination & custom CAD/technical documentation.
- ▶ **Primary AI Value:** Capturing installer/engineer tacit knowledge; client offer generation.
- ▶ **Key Risk:** Engineering safety & custom design errors.

HISTRIS (Food Manufacturing)

- ▶ **Focus:** Food safety compliance, HACCP, & production traceability.
- ▶ **Primary AI Value:** Standardized procedure guidance; compliance log automation.
- ▶ **Key Risk:** Regulatory violation & product quality deviation.

Shared Socio-Technical Core

Readiness factors depend less on technical sector than on **knowledge intensity** and **need for human oversight**.

Theoretical & Socio-Technical Reflections

- ▶ **TOE Framework & Rogers' Diffusion of Innovations:**
 - ▶ Environmental regulation and organizational readiness shape adoption far more than technology push.
- ▶ **Human-Centered AI Principles (Amershi et al., 2019):**
 - ▶ Systems must preserve user control, explainability, and graceful handling of model failures.
- ▶ **LLM Risk Taxonomy Alignment (Weidinger et al., 2022):**
 - ▶ Concerns regarding hallucination, bias, and governance emerge **spontaneously in pre-adoption**, prior to any financial or deployment commitment.

Dual-Value Model of Industry-Academia Engagement

1. Educational Benefit for Students

- ▶ Applied complex systems engineering.
- ▶ Interdisciplinary teamwork (CS + Econ).
- ▶ Direct C-level presentation & pitch experience.

2. Research Benefit for Science & SMEs

- ▶ Authentic empirical data collection.
- ▶ 12 validated prototype concepts for SMEs.
- ▶ Low-risk exploratory methodology.

Implications for Practitioners & Researchers

For Industry Practitioners

- ▶ **Broaden Planning Scope:** Move beyond benchmark scores; address data governance & literacy early.
- ▶ **Human-in-the-Loop:** Design explicit human verification interfaces to mitigate hallucination risks.

For Academic Researchers

- ▶ **Transferable 9D Framework:** Apply structured analytical lenses for comparative cross-sector studies.
- ▶ **Focus on Pre-Adoption:** Investigate early readiness to reduce high AI project failure rates.

Conclusion & Acknowledgments

Key Takeaways

- ▶ AI adoption readiness is a **multidimensional socio-technical challenge**, driven by trust, workflow fit, and governance rather than pure model capabilities.
- ▶ Pre-adoption exploratory engagements provide essential insights before financial investment.

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Thank You for Your Attention!

Questions & Discussion